

# Fast-food consumption among US adults and children: Dietary and nutrient intake profile

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## ABSTRACT

**Objective** To examine the dietary profile associated with fast-food use. To compare the dietary intake of individuals on the day that they ate fast food with the day that fast food was not eaten.

**Design** Cross-sectional study design. The dietary intake of individuals who reported eating fast food on one or both survey days was compared with those who did not report eating fast food. Among the individuals who reported eating fast food, dietary intake on the day when fast food was eaten was compared with the day when fast food was not eaten. Weighted comparison of mean intakes and pairwise t-test were used in the statistical analysis.

**Subjects/setting** Data from 17,370 adults and children who participated in the 1994-1996 and 1998 Continuing Survey of Food Intakes by Individuals. Dietary intake data were collected by 2 non-consecutive 24-hour dietary recalls.

**Results** Fast-food use was reported by 37% of the adults and 42% of the children. Adults and children who reported eating fast food had higher intake of energy, fat, saturated fat, sodium, carbonated soft drink, and lower intake of vitamins A and C, milk, fruits and vegetables than those who did not reported eating fast food ( $P < .001$ ). Similar differences were observed among individuals between the day when fast food was eaten and the day when fast food was not eaten.

**Conclusions** Consumers should be aware that consumption of high-fat fast food may contribute to higher energy and fat intake, and lower intake of healthful nutrients. *J Am Diet Assoc.* 2003;103:1332-1338.

Fast food is a growing component of the American diet, and the frequency of fast-food use has increased dramatically since the early 1970s (1). The number of fast-food outlets increased from about 30,000 in 1970 to 140,000 in 1980, and fast-food sales increased by about 300% (1). More recent estimates show that in 2001, there were about 222,000 fast-food locations in the United States, generating sales of more than \$125 billion. The number is projected to increase by 4.1% in 2002, with estimated sales of \$130.1 billion (2). The same report also indicated that three of 10 consumers agreed that meals at a restaurant or fast-food establishment are essential to the way they live, and three of five consumers reported that they plan to eat at fast-food restaurants in 2002 about as often as they did in 2001.

Fast food is especially popular among adolescents, who on average visit a fast-food outlet twice per week (3,4). A survey of 4,746 students 11 to 18 years of age reported that about 75% ate at a fast-food restaurant during the week before the survey (5). The same survey showed that fast-food use was associated with higher intake of fried potato, hamburger, pizza, and soft drink, and lower intake of fruits, vegetables, and milk. Fast food is high in fat and energy, and although fast-food restaurants have diversified to include a broader range of foods, hamburgers and french fries continue to be leaders in terms of sales volume (1). A small order of french fries typically contains about 200 calories and 10 g of fat, and a large hamburger contains nearly 600 calories and 35 g of fat. Consequently, many people have raised concerns about the nutritional quality of

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fast food, not only for children and adolescents but also for adults (4-8). Previous studies have shown that despite its high fat content, fast food provides an adequate intake of protein and carbohydrate. However, these studies have focused on the fat and energy derived from fast food and have not assessed the broader impact that fast food might have on the overall diet.

This study used the data from a representative sample of US adults and children to examine the cross-sectional association between fast-food consumption and diet quality. It was based on three hypotheses. First, the sociodemographic factors may be associated with fast-food use. In particular, fast-food use is common among children and adolescents, young adults, and people with higher income. Second, individuals who reported eating fast food on a given day may have a less favorable dietary and nutrient intake profile compared with those who did not report eating fast food. Third, the dietary intake profile on the days when individuals reported eating fast food may be less favorable compared with the days when these individuals did not eat fast food.

## SUBJECTS AND METHODS

The 1994-1996, 1998 Continuing Survey of Food Intakes by Individuals (CSFII) was conducted in a nationally representative sample of the civilian population in the United States using a stratified, multistage, area probability sample design. The details of the survey design and methods are available elsewhere (9). Briefly, the in-person interview was used to collect a wide range of sociodemographic, dietary, and health data from the survey participants. In 1994-1996, the total of 20,126 adults and children were selected into the sample. Of these, 16,103 individuals (80%) completed the interview. An additional representative sample of 6,413 children 9 years of age or younger was added to the survey in 1998, using the same design and methodology.

Data used in this study include sociodemographic data (age, gender, race, income, education, and household size) and the dietary intake data. Four racial/ethnic groups were defined: non-Hispanic white ( $n=12,188$ ), non-Hispanic black ( $n=2,227$ ), Hispanic ( $n=2,182$ ), and other ethnicities including Asians, Pacific Islanders, American Indians and Alaska natives ( $n=773$ ). Income was classified into three categories: less than 100%, 101% to 299%, and more than 300% of the Federal poverty guidelines based on household size and income (10). Education level was ascertained by the actual number of years of schooling completed. This was classified into four categories: less than high school education, high school education, some college education, and 4 or more years of college education. Household size was classified as households with three or fewer members and those with four members or more.

Dietary data were collected by two nonconsecutive 24-hour dietary recalls using multiple-pass methodology, whereby the survey respondents were systematically interviewed to provide as complete information as possible. The two dietary recalls were conducted 3 to 10 days apart, but not on the same day of the week. Proxy interview of an adult household member was used in children less than 6 years of age, although those 6 to 11 years of age (6 to 9 years of age in CSFII 1998) were asked to provide their own food intake data, assisted by an adult.

The interviewer used a food instruction booklet to probe for a complete description of every food and the amount eaten. Fast-food intake, if any, was specifically queried regarding the place where the food was obtained (fast-food

place, pizza place). The names of several fast-food establishments as well as the commercial names of fast-food items were also provided. This study did not focus on the other foods that were eaten away from home (eg, at restaurants with table service and school cafeterias). From the total 18,081 adults and children 2 years of age or older who completed the two 24-hour dietary recalls, 17,370 (96%) provided complete data for analysis.

## STATISTICAL ANALYSIS

The appropriate sampling weights were used in the analyses to compensate for variable probabilities of selection, differential nonresponse rates, and possible deficiencies in the sampling frame (9). The proportion of individuals who reported eating fast food on one or both survey days was calculated, and was stratified by age group, gender, race/ethnicity, income, education, and household size. The intake of selected foods and nutrients among individuals who reported eating fast food on one or both survey days was compared with those who did not eat fast food on either day. Separate analyses for men and women showed similar results, so they were combined together. The results from younger children (eg, less than 5 or less than 10 years old) also showed a pattern similar to that of older children and adolescents, so they were analyzed as a single group. The comparison of proportions was made by using  $\chi^2$  statistics corrected for the survey design, and comparison of means was made by using the linearization method. Among the 6,858 individuals who reported eating fast food, the diet on the day that fast food was eaten and the diet on the day that fast food was not eaten (excluding 1,475 individuals who ate fast food on both survey days) were compared. In this comparison ( $n=5383$ ), the unweighted results were presented because the sampling weights were different for each survey day, and the paired *t*-test was used to compare the diet on the day when fast food was eaten with the day when fast food was not eaten. Because this was the within-individual comparison, data from adults and children were combined in this analysis. Separate analyses for adults and children showed similar results. All analyses were performed using Stata (version 7.0, 2001, Stata Corporation, College Station, TX) and SAS (version 8.1, 1999-2000, SAS Institute Inc, Cary, NC).

## RESULTS

Table 1 presents the sociodemographic characteristics of the adults and children who reported eating fast food on one or both survey days. The percentage of individuals who reported eating fast food was higher among those 10 to 39 years of age and declined in older individuals. Men reported more frequent use of fast food than women, as did people with high school and some college education, individuals with higher income, and households with four or more members. The reported use of fast food was lowest among people 60 years of age and older and among people with a household income of 100% of the poverty threshold or less.

The food and nutrient intake profile of children and adults who reported eating fast food and those who did not report eating fast food on either survey day is shown in Tables 2 and 3. The children and adolescents who reported eating fast food had a significantly lower intake of bread and cereals. They also consumed fewer dark green vegetables and other vegetables, but significantly more fried potato. The intake of other (non-citrus) fruits and juices, milk, and legumes was lower compared with the intake of those who did not report eating fast food.

**Table 1**  
Sociodemographic characteristics of the study population and the percentage of individuals who reported eating fast food on one or both survey days\*

	Sample size	Reported fast food intake (%)	P†
Total sample	17,370	42.2	
Age (y)			
2 to 9	6,754	41.7	
10 to 19	1,796	50.3	
20 to 39	2,701	52.0	
40 to 59	3,203	40.5	
60 and over	2,916	20.1	<.001
Gender			
Male	8,658	44.4	
Female	8,712	40.2	<.001
Race/ethnicity			
White	12,188	42.0	
Black	2,227	45.8	
Hispanic	2,182	40.5	
Others‡	773	38.5	.2
Education§			
Less than high school	2,374	36.6	
High school	3,145	43.3	
Some college	1,849	46.0	
Four or more years of college	2,061	41.7	<.001
Household income (percent of poverty)			
<100	3,285	32.1	
101 to 299	7,254	41.3	
300 and over	6,831	45.5	<.001
Household size			
3 or fewer	8,131	39.4	
4 or more	9,239	45.6	<.001

\*Weighted estimates.

†P value for the difference in reported fast food use, based on the  $\chi^2$  test of statistical independence within each sociodemographic group.

‡Including Asian, Pacific Islander, American Indian, and Alaska native.

§Data available from survey respondents 15 years and older.

They also reported higher intake of chicken, meat mixture (dishes that consist mainly of meat), and carbonated soft drinks. In terms of energy and nutrients, the children who reported eating fast food had a significantly higher intake of total energy and fat, and a lower intake of protein, vitamin A, and beta carotene compared with children who did not report eating fast food.

The adults who reported eating fast food had a significantly lower intake of bread, cereals, grains, milk, and legumes. The intake of all fruits and vegetables was lower, except for fried potato, which was more than twice higher than the intake of those who did not report eating fast food. Individuals who reported eating fast food also consumed more chicken, meat mixture, and grain mixture (dishes that consist mainly of grain, including pizza and lasagna). Carbonated soft drink intake was more than doubled compared with that of those who did not report eating fast food. The intake of total energy, fat, cholesterol, sodium, and calcium was significantly higher, whereas the intake of carbohydrate, protein, dietary fiber, vitamin A, vitamin C, and beta carotene was significantly lower in the adults who reported eating fast food compared with those who did not report eating fast food.

Among 5,383 adults and children who reported eating fast food on one of the two survey days (excluding those who ate fast food on both days), the diet on the day that fast food was

eaten was compared with the diet on the day that fast food was not eaten. This is shown in Table 4. On the day that fast food was eaten, the subjects consumed less grains, cereals, fruits, vegetables, milk, and legumes compared with the day that fast food was not eaten. They also consumed more grain mixture, meat mixture, chicken, fried potato, and carbonated soft drinks. On the day that fast food was eaten, the intake of energy, fat, saturated fat, calcium, and sodium was higher, and the intake of carbohydrate, protein, dietary fiber, vitamin A, vitamin C, and beta carotene was lower compared with the day that fast food was not eaten.

## DISCUSSION

Because of time constraints, convenience, and lifestyle, fast food has become an increasingly important part of the American diet. In 1970, money spent on foods eaten away from home accounted for 25% of total food spending; by 1999 it had reached a record 47% of total food spending (11,12). This study shows that fast food, not including other foods eaten away from home (eg, at school cafeterias), may contribute to high intake of energy, fat, sodium, carbonated soft drinks, and fried potato, and low intake of milk, fruits, vegetables, dietary fiber, and some vitamins. The previous studies of fast food and diet quality are limited, but it has been suggested that fast food may encourage soft drink consumption and may be associated with low intake of fruits, vegetables, and milk in both adults and children (1,5).

Results from this study show that fast-food use varied with sociodemographic factors, being higher among children and adolescents, young adults, and people with higher income compared with other groups. These findings are consistent with the available data. Whether education may influence fast-food use is not known, but the results from this study suggest that more education may be associated with fast-food consumption. However, fast-food use may decline at the highest levels of education. In this sample, people with 4 or more years of college education reported lower fast-food consumption compared with those with high school or some college education. In contrast to previous studies, however, the household size was positively associated with fast-food use.

It is generally believed that fast food contributes to a poor diet (13,14), although the evidence is limited and previous studies focused mainly on energy and fat derived from fast food. Results from this study are similar to those reported in the studies of fast-food consumption among women and students in grades 7 to 12, where fast-food intake was associated with higher intake of fried potato and soft drinks and lower intake of fruits, vegetables, and milk (1,5). In contrast to previous studies, these results show that fast-food use was associated with higher calcium intake among the adults. This may reflect the trend for increasing cheese consumption in the United States, which is at a record level, perhaps because of the popularity of foods such as cheeseburgers, pizzas, and tacos (11).

The 1994-1996 and 1998 CSFII data provide detailed descriptions of every food, where it was obtained, and the amount eaten. In addition, the two nonconsecutive dietary recalls enabled us to compare the diets of the same individuals on the day that fast food was eaten and the day that fast food was not eaten. Such within-person difference has not been previously reported in the general population of the United States or elsewhere. Again, fast-food use was associated with a less favorable dietary profile, suggesting that individuals may eat differently

**Table 2**

Food intake of children and adolescents (n=8,307) and adults (n=9,063) who reported eating fast food on one or both survey days compared with those who did not report eating fast food\*

Children and adolescents (g/day)	Reported eating fast food		P <sup>†</sup>
	Yes (n=3,508)	No (n=4,799)	
Grains and cereals			
Bread, roll	39 (1)	43 (1)	.006
Cereal, rice, pasta	57 (3)	77 (3)	<.001
Grain mixture	114 (5)	110 (4)	.5
Other grain products	67 (2)	67 (1)	.8
Fruits			
Citrus fruits and juices	66 (5)	70 (5)	.5
Other fruits and juices	103 (4)	130 (4)	<.001
Vegetables			
Dark green/deep yellow vegetables	9 (1)	12 (1)	<.001
Fried potato	35 (1)	17 (1)	<.001
Other vegetables	71 (3)	90 (3)	<.001
Legumes, nuts, seeds	14 (1)	19 (1)	.001
Milk and milk products			
Fluid milk	260 (8)	308 (9)	<.001
Cheese	13 (1)	14 (1)	.5
Milk dessert	28 (1)	24 (1)	.03
Other milk products	54 (3)	49 (2)	.2
Meat and meat products			
Beef	17 (1)	17 (1)	.9
Pork	6 (0.5)	7 (1)	.1
Chicken	23 (1)	17 (1)	<.001
Fish and shellfish	5 (1)	6 (1)	.4
Other meat	24 (1)	28 (1)	.006
Meat mixture	81 (4)	64 (3)	.001
Egg	12 (1)	13 (1)	.7
Fats, oils, sugars			
Fats and oils	7 (0.5)	8 (0.5)	.1
Sugars and sweets	37 (2)	32 (1)	.04
Beverages			
Fruit drinks	139 (8)	141 (6)	.8
Carbonated soft drinks	358 (14)	179 (7)	<.001
<b>Adults</b>			
(g/day)			
	Yes (n=3,350)	No (n=5,713)	P <sup>†</sup>
Grains and cereals			
Bread, roll	48 (1)	54 (1)	<.001
Cereal, rice, pasta	56 (3)	83 (3)	<.001
Grain mixture	109 (4)	93 (3)	<.001
Other grain products	61 (2)	64 (1)	.2
Fruits			
Citrus fruits and juices	57 (3)	72 (3)	<.001
Other fruits and juices	67 (3)	106 (3)	<.001
Vegetables			
Dark green/deep yellow vegetables	17 (1)	26 (1)	<.001
Fried potato	31 (1)	13 (1)	<.001
Other vegetables	137 (3)	178 (4)	<.001
Legumes, nuts, seeds	19 (1)	33 (2)	<.001
Milk and milk products			
Fluid milk	126 (4)	149 (5)	<.001
Cheese	15 (1)	16 (1)	.3
Milk dessert	25 (1)	24 (1)	.4
Other milk products	26 (2)	24 (1)	.3
Meat and meat products			
Beef	25 (1)	25 (1)	.7
Pork	9 (1)	12 (1)	<.001
Chicken	26 (1)	20 (1)	<.001
Fish and shellfish	11 (1)	12 (1)	.3
Other meat	29 (1)	31 (1)	.3
Meat mixture	128 (4)	88 (3)	<.001
Egg	19 (1)	17 (1)	.07
Fats, oils, sugars			
Fats and oils	15 (1)	16 (0.5)	.03
Sugars and sweets	19 (1)	21 (1)	.06
Beverages			
Coffee, tea	479 (12)	508 (13)	.03
Fruit drinks	70 (3)	64 (3)	.07
Carbonated soft drinks	459 (12)	239 (9)	<.001
Alcoholic beverages	137 (12)	96 (7)	.004

\*Weighted estimates. Data are presented as mean (standard error).

<sup>†</sup>P value for the difference in intake between individuals who reported eating fast food and those who did not report eating fast food.

**Table 3**

Intake of energy and selected nutrients of children and adolescents (n=8,307) and adults (n=9,063) who reported eating fast food on one or both survey days compared with those who did not report eating fast food\*

Children and adolescents	Reported eating fast food		P†
	Yes (n=3,508)	No (n=4,799)	
Total energy (kcal)	1,971 (21)	1,816 (18)	<.001
Carbohydrate (% total energy)	53.9 (0.2)	54.1 (0.2)	.5
Protein (% total energy)	13.7 (0.1)	14.3 (0.1)	<.001
Fat (% total energy)	32.4 (0.1)	31.6 (0.1)	<.001
Saturated fat (% total energy)	11.8 (0.1)	11.5 (0.1)	.003
Total fat (g)	71 (1)	64 (1)	<.001
Saturated fat (g)	26 (0.5)	23 (0.5)	<.001
Cholesterol (mg)	214 (4)	213 (4)	.9
Dietary fiber (g)	12 (0.2)	13 (0.2)	.05
Vitamin A (retinol equivalent)	787 (21)	905 (19)	<.001
Vitamin C (mg)	92 (3)	100 (2)	.02
Vitamin E (mg)	6 (0.1)	6 (0.1)	.6
Beta carotene (retinol equivalent)	269 (13)	344 (11)	<.001
Sodium (mg)	3,001 (35)	2,900 (36)	.02
Calcium (mg)	875 (15)	868 (14)	.7
Potassium (mg)	2,244 (27)	2,253 (26)	.8
Iron (mg)	14 (0.3)	14 (0.2)	.3

  

Adults	Reported eating fast food		P†
	Yes (n=3,350)	No (n=5,713)	
Total energy (kcal)	1,973 (14)	1,768 (12)	<.001
Carbohydrate (% total energy)	49.9 (0.2)	51.4 (0.2)	<.001
Protein (% total energy)	15.7 (0.1)	16.4 (0.1)	<.001
Fat (% total energy)	34.4 (0.2)	32.2 (0.2)	<.001
Saturated fat (% total energy)	11.6 (0.1)	10.6 (0.1)	<.001
Total fat (g)	76 (1)	64 (1)	<.001
Saturated fat (g)	26 (0.2)	21 (0.2)	<.001
Cholesterol (mg)	263 (4)	243 (4)	<.001
Dietary fiber (g)	14 (0.2)	16 (0.2)	<.001
Vitamin A (retinol equivalent)	823 (18)	1,048 (23)	<.001
Vitamin C (mg)	82 (2)	99 (2)	<.001
Vitamin E (mg)	8 (0.1)	8 (0.1)	.3
Beta carotene (retinol equivalent)	399 (11)	571 (18)	<.001
Sodium (mg)	3,309 (31)	3,060 (31)	<.001
Calcium (mg)	725 (10)	689 (7)	.001
Potassium (mg)	2,512 (20)	2,584 (21)	.008
Iron	15 (0.2)	14 (0.2)	.5
Caffeine (mg)	226 (5)	214 (5)	.04
Alcohol (g)	6.9 (0.5)	5.1 (0.4)	.004

\*Weighted estimates. Data are presented as mean (standard error).

†P value for the difference in intake between individuals who reported eating fast food and those who did not report eating fast food.



and may eat fewer other foods on the day that fast food is consumed.

Fast-food use is not a dietary habit per se, and people eat fast food for reasons such as convenience and a busy lifestyle. Therefore, the increase in fast-food consumption in the United States is likely to continue. A strong criticism of the fast-food industry (15) was met by an equally strong rebuttal from the fast-food industry (16). Many fast-food enterprises have expanded the range of options to include healthful foods. However, it is questionable whether foods such as fruits and vegetables would be selected if offered at fast-food restaurants because this choice may reflect the perceived lack of taste rather than lack of availability. Based on the available evidence, it is concluded that if it is necessary to eat fast food, then choosing the lower-fat items that are available at many fast-food locations may help with reducing the excess energy intake associated with high-fat items. In addition, as with other high-fat foods, the highly palatable high-fat fast foods may result in an excessive energy intake. Again this may be avoided by choosing lower-fat items.

This study has limitations. First, the cross-sectional study design does not provide evidence of the causal relationship between fast-food consumption and diet quality. Second, dietary data collected from the population are subject to measurement error and bias, particularly those caused by the underreporting of intake by overweight and obese individuals. Although we believe that the CSFII dietary data are of good quality, the effect of such bias on our results cannot be assessed.

## APPLICATIONS

■ Fast food has become an important part of the American diet, and the increase in fast-food use in the United States is likely to continue. The excess energy intake associated with eating fast food may be avoided by choosing lower-fat items and avoiding the side items, such as french fries and soft drinks. The widespread use of fast food among children and adolescents is of concern because the high fat and energy intake may contribute to childhood and subsequent adult obesity. However, addi-

tional data, especially the longitudinal data, are needed to examine this relationship.

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